

## CLAIMS

1. An improved actuator for water heating/cooling and sanitary systems, including a driving motor and a related reducing unit operating on a spring preloaded shutter driving a component such as a valve, manifold or the like, **characterized** in that said actuator comprises, in a support framework,
- a) an electric motor comprising a miniaturized D.C. motor,
  - b) a first reducing unit comprising a planetary reducing unit providing a high reduction ration,
  - c) a second reducing unit arranged between the first reducing unit and an element operatively associated to the shutter, said second reducing unit including a worm screw for transforming a rotary movement into an axially reciprocating movement,
  - d) a mechanical clutch element, operatively arranged between an output of said D.C. motor and an inlet of said first planetary reducing unit,
  - e) an electronic control card for controlling and driving said D.C. motor depending on a presettable heating/cooling program, and
  - f) mechanic coupling means for coupling to said valve, manifold or the like, including the shutter to be driven.
2. An improved actuator according to claim 1, **characterized** in that said miniaturized D.C. electric motor comprises a D.C. small motor having a power drain less than 1 W, preferably less than 0,6 W, and with an outer diameter equal to or less than 15 mm.
3. An improved actuator according to Claim 1, **characterized** in that the first planetary reducing unit provides a reduction ratio greater than 1000, and that said first planetary reducing unit comprises three planetary gears rotating about two gear rings, said gear rings having a different number of teeth, preferably one of said gear ring having 1 tooth less than the other

gear ring, to provide a different RPM.

4. An improved actuator according to Claim 1, **characterized** in that said second reducing unit comprises a driving gear wheel and a second gear wheel or pinion having an inside threaded sleeve and housing with a threading engagement a worm screw element to transform a rotary movement into an axial reciprocating movement, wherein said worm screw element has an end operatively cooperating with a rod, or the like, of the shutter driving element.

5. An improved actuator according to Claim 4, **characterized** in that said worm screw element has, at a top thereof, a further end visually projecting from a bell housing support and operating as a visual element for visually indicating the position of said shutter and/or as a limit switch driving element.

6. An improved shutter according to Claim 1, **characterized** in that said shutter comprises a support framework including a middle support supporting said first reducing unit with said mechanical clutch and said second reducing unit, a support base which can be coupled to said middle support, and a cage element having legs which can be plugged in said support base for protecting said electric D.C. motor.

7. An improved actuator according to one or more of the preceding claims, **characterized** in that it comprises a covering cap which can be coupled, preferably in a removable manner, for example by a snap type of engagement, to said actuator support framework.

8. An improved actuator according to Claim 7, **characterized** in that said covering cap is made, at least at a region thereof, of a clear material to detect a position of a signaling element indicating the instantaneous position of said shutter.

9. An improved shutter, according to Claim 1, **characterized** in that said mechanical coupling means for coupling

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to said valve, manifold or the like, comprise a plurality of differently arranged adapters each of which can be coupled to a valve, manifold or the like of a desired maker.

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